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ABSTRACT

A career guidance system to encourage and assist physically handicapped secondary level students and adults to undertake science careers was designed, produced, and field tested. Focus is on visual, hearing, and orthopedic handicaps. The following products were developed: (1) two hundred twenty-eight science-related career briefs in large print, audio tape, Braille, and microfiche formats (each includes job description, preparation requirements, earnings, and employment outlook); (2) ten sound filmstrips showing sixty handicapped scientists filmed on the job; (3) radio and television public service announcements about science career opportunities for the physically handicapped; (4) a science career guide for the visually handicapped; (5) self-career exploration and decision making exercises; and (6) companion science and work-related glossaries for those with severe hearing handicaps. These products can be used independently by handicapped and non-handicapped individuals in classrooms, rehabilitation centers, and other career guidance settings as well as for the training of personnel for these locations. A project evaluation indicated that all developmental objectives were met. The major problem was the lack of time for adequate field testing of developed materials. (The appendix, comprising two-thirds of this report, includes the following: a list of the two hundred twenty-eight career brief jobs, sample career briefs, sample scripts for television and radio public service announcements, sample letters, and sample interview and survey forms. (EM)

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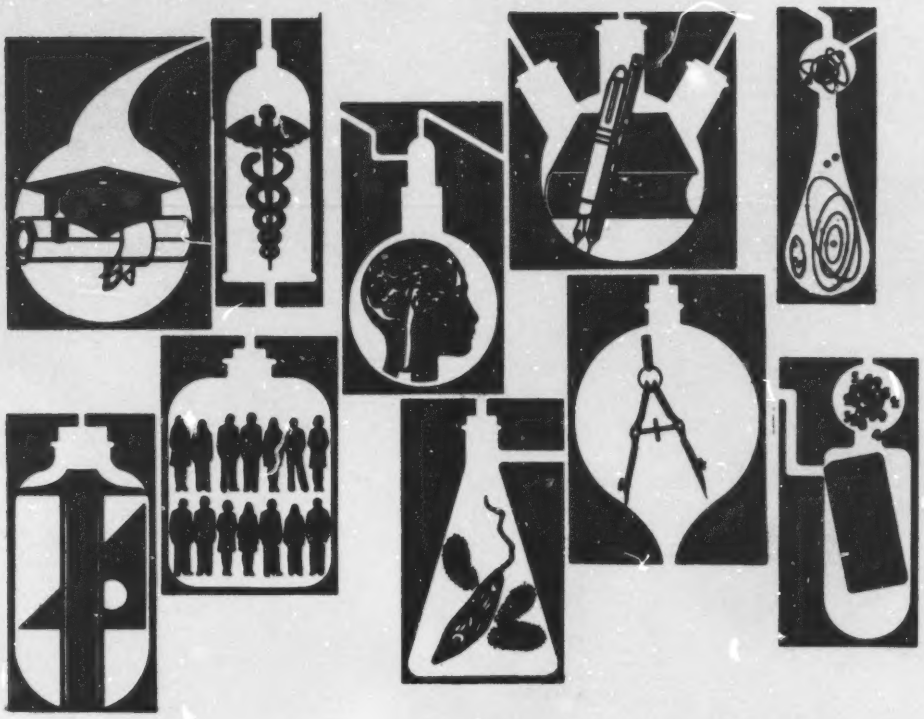

A Science-Oriented Career Guidance System for the Physically Handicapped

SMI77-19915

Final Report & External Evaluation

Submitted By:

Thomas County Board of Education
Thomasville, Georgia

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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TO:

National Science Foundation
Physically Handicapped in Science Program

October 31, 1978

CE 018 924

Final Report & External Evaluation

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Neal H.Berger, Director
John R. Clark, Project Consultant
Walter Cameron, Project Evaluator
Biff Hobbs, Project Assistant

Developed By:
Thomas County Schools
P. O. Box 440
Thomasville, Georgia 31792

October 31, 1978

CE 018924

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However, any opinions, findings, conclusions or recommendations expressed herein are those of the authors and do not necessarily reflect the views of the Foundation.

SCI-PHI

Science Career Information for the Physically Handicapped Individual

October 31, 1978

Dr. Lafe R. Edmunds
National Science Foundation
Division of Grants & Contracts
Post-Award Projects Branch
1800 G. Street, N. W.
Washington, DC 20550

Dear Dr. Edmunds:

Attached is the Final Report and External Evaluation for our Physically Handicapped in Science project. It has been a rewarding professional and personal experience to work with you, the National Science Foundation and many handicapped scientists nationwide.

I sincerely hope that our project benefits the physically handicapped and their science careers. I look forward to working with the Foundation in the future.

Sincerely,

Neal H. Berger

Neal Berger
Director

NB/bs

P.O. Box 440 — Thomasville, Georgia 31792

Neal H. Berger, Director

Thomas County Board of Education

Phone: 912 226-7102

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

FINAL PROJECT REPORT
NSF FORM 98A

PLEASE READ INSTRUCTIONS ON REVERSE BEFORE COMPLETING

PART I–PROJECT IDENTIFICATION INFORMATION

1. Institution and Address	2. NSF Program	3. NSF Award Number
Thomas County Schools P. O. Box 440 Thomasville, Ga. 31792	Physically Handicapped in Science	SMI77-19915
	4. Award Period From 8/1/77 To 7/31/78	5. Cumulative Award Amount $59,645.00

6. Project Title: A Science-oriented Career Guidance System for the Physically Handicapped Individual. (Project SCI-PHI-Science Career Information for the Physically Handicapped Individual)

PART II SUMMARY OF COMPLETED PROJECT *(FOR PUBLIC USE)*

The central purpose of this project was to design, produce and field-test a science-related career information and guidance system to encourage and assist secondary students and adults, with visual, hearing, and/or orthopedic handicaps, to enter science careers. The following products were developed with the assistance of the project's Handicapped National Science Advisory Board: (1) 228 Science Career Briefs in large print, microfiche, sound-cued audio tape and Braille formats; (2) 10 sound filmstrips depicting approximately 60 handicapped scientists filmed on-the-job; (3) Radio and T. V. Public Service Announcements to inform the handicapped and general public about science career opportunities for the physically handicapped; (4) A Science Career Guide for the Visually Handicapped Student; (5) Self, Career Exploration and Decision Making exercises; (6) Companion science and work-related Glossaries for those with severe hearing handicaps and (7) A Final and External Evaluation report.

In summary the working philosophy of SCI-PHI was that any person, regardless of his or her assets or liabilities, should be provided with: (a) information about all science-related career options and opportunities; (b) information translated into appropriate media for independent use, and (c) information which will permit the user to make better decisions. Thus, we have not compiled lists of science job titles tied to specific handicapping conditions.

The products can be used independently by handicapped and non-handicapped individuals in classrooms, rehabilitation centers and other career guidance settings, as well as for pre- and in-service training of personnel for these locations.

An extensive field-test, impact evaluation and revisions of Project products and processes are recommended for validation.

PART III–TECHNICAL INFORMATION *(FOR PROGRAM MANAGEMENT USES)*

1. ITEM *(Check appropriate blocks)*	NONE	ATTACHED	PREVIOUSLY FURNISHED	TO BE FURNISHED SEPARATELY TO PROGRAM	
				Check (✓)	Approx. Date
a. Abstracts of Theses	X				
b. Publication Citations				X	1/79
c. Data on Scientific Collaborators	X				
d. Information on Inventions	X				
e. Technical Description of Project and Results			X		
f. Other *(specify)* Filmstrips, Career Briefs				X	

2. Principal Investigator/Project Director Name *(Typed)*	3. Principal Investigator/Project Director Signature	4. Date
Neal H. Berger, Director	Neal H. Berger	10/31/78

NSF Form 98A (5-78) Supersedes All Previous Editions

Form Approved OMB No. 99R0013

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INTRODUCTION

One of the responsbilities of the Science Education Directorate of the National Science Foundation is to increase participation in scientific careers by physically handicapped individuals with aptitude and interest in science. In fiscal year 1976 N. S. F. initiated their Handicapped in Science Program.

On August 1, 1977 the Thomas County School Board in Thomasville, Georgia was awarded a grant, SMI77-19915, to design a science-oriented career guidance system for physically handicapped individuals. This project has been called SCI-PHI (Science Career Information for the Physically Handicapped Individual). This report documents the design, development and pilot field testing of this project. It also includes the External Evaluation of this project and its products.

CENTRAL PURPOSE

The central purpose of this project was to design, produce and field test a career guidance system which will encourage and assist physically handicapped individuals to undertake careers in science. The target population included persons with visual, auditory and/or orthopedic handicaps, from junior high age through adult. The following products developed with the assistance and input of the project's National Science Advisory Board:

1. Ten Color Filmstrip/Tape Presentations

   These presentations feature about 60 handicapped individuals in science-related careers, show on-the-job. The tape and written script narrative provides informative and inspirational information about their careers, handicap, and training, along with comments on the type of advise the individuals would like to have received while pursuing their own education and careers. For those with

extreme hearing handicaps, an especially designed "captioned version" is available in print on a fourth grade reading level, along with a glossary of science terms and related expressions.

2. Two hundred and twenty-eight Science-related Career Briefs (See Appendix I).

   These career briefs have been developed in large print, audio tape, Braille and microfiche formats. It includes vital up to date information as follows: job description, career and education preparation requirements, working conditions, typical time spent in physically-related worker tasks, earnings, and employment outlook through the 1980's, D.O.T. numbers, a career ladder and sources of additional information. For those with extreme hearing handicaps, a complete glossary written on a 4th grade level serves as a companion to these briefs.

3. Radio and Television Public Service Announcements, (PSA's). (See Appendix II).

   PSA's were developed to inform the handicapped and public in general about science career opportunities for the handicapped. These PSA's were aired in about 20 locations nationwide. The PSA's were in full color and captioned.

4. Science Guide for the Visually Handicapped Student.

   This guide was developed for the high school and college students to provide them and their teachers, with information on techniques, devices, equipment, strategies and advice for pursuing a science career.

PROJECT PHILOSOPHY

The working philosophy of this project was derived as a direct outgrowth of the project's National Science Advisory Board's (NSAB), input, (See Appendix III). The NSAB was composed of over 25 handicapped scientists and vocational rehabilitation division heads from the Georgia Department of Human Resources. The NSAB was selected with the assistance of Dr. Martha Redden from A. A. A. S. In summary the philosophy of SCI-PHI is that any person, regardless of his or her assets or liabilities, should be provided with: A) information about all career options and opportunities, B) information translated into media that can be used independently, and C) information which will permit the handicapped user to make better decisions. Thus, we have not compiled lists of specific jobs for each target handicapped group. Instead, the user can investigate all science-related careers by using the media of filmstrip/audio tape or (written script), the printed page, Braille, audio tape and/or microfiche. It is the user's responsibility, (perhaps with the assistance of his or her counselor or teacher), to make wise career decisions. Wise decisions are based upon reliable and accessible information, the opportunity to assess one's assets in terms of this information and the opportunity to develop alternatives to their deficits.

Individually and as a group members, the project's NSAB contributed to this working philosophy. These contributions will be briefly discussed below.

1) Filmstrip/tapes

Many members of the NSAB were themselves photographed and interviewed in-depth for this product. (See Appendix IV for interview format). These individuals not only provided vital information about their own careers and education, but they also willingly set the tone for the type of information and encouragement needed by the handicapped.

2) 228 Career Briefs

One blind member of the NSAB strongly recommended that we do not list specific science occupations that we thought would be "realistic" for each handicapped target group. He felt, and we agreed, that we would not be doing the handicapped person any favors in this manner. Furthermore, this advisory board member was also responsible for the development of the typical worker tasks section of each career brief. This section provides the user with a listing of 19 physically-related worker tasks and a rating of the typical time spent in each of these activities while on-the-job. Approximately 800 scientists throughout the country were surveyed and asked to indicate the typical percent of time they performed these 19 physically related tasks. Approximately 67% of those surveyed responded and the results were tabulated and analyzed. These survey results, along with our own familiarity with the occupations, provided us with the information needed to code-out the relative percent of time an individual might expect to perform each of 19 physically-realted tasks. (See Appendix V for a sample survey form.)

3) Public Service Announcements

The NSAB was sent drafts for proposed radio and T.V. PSA's. A major suggestion for a change in the radio PSA's was adopted. This suggestions was to use a handicapped scientist as the role models for narration rather than our originally proposed, handicapped entertainer of national recognition. Many NSAB members felt that this revision would add a personal and reality touch to the message.

The primary input from the NSAB on the T.V. PSA's which resulted in significant changes were as follows:

Not to refer to the work being carried on by the scientists as a problem. This might confuse the viewer/listener with the problems that the individuals have. Also, to avoid sexual stereotyping by referring to all individuals by their names and titles.

4) Science Guide for the Physically Handicapped.

Advisory Board input effected this guide by providing more detailed information to assist the college level student. The guide was changed from a primarily motivational approach to one which is more informative about specific procedures for the visually handicapped to use in school.

FIELD TEST

In the original project proposal it was envisioned that all project products would undergo a pilot field test from March to May, 1978. Because of time constraints, the field test time for these materials were limited to about 1½ months. Selected rehabilitation field counselors, evaluators, teachers, and career guidance personnel were familiarized with the materials at the following sites in Georgia: Georgia Rehabilitation Center at Warm Springs, Atlanta Area School for the Deaf, Georgia Academy for the Blind, Atlanta Area Services for the Blind and the Atlanta Rehabilitation Center. For a complete analysis of the field test refer to the project evaluation report attached to this report. Unsuccessful attempts were made by the project director to locate funds for a more complete field testing, revision and dissemination of project products. The potential funding resources contacted all felt that project products were excellent and needed by handicapped users, however, they were unable to encourage further funding to start in August, 1978 for the following reasons: it was too late to submit a grant application for this funding cycle or, unless products were originally developed under the auspicies of their grant program, it would not be possible to field test under their funding and/or, their agency.

POTENTIAL USER SITES AND MODES

Based upon the feedback from individuals at our field test sites and individuals who have reviewed project products, the following describes possible modes and sites for the use of SCI-PHI products:

1. Public & Private Schools (grades 7 through 12).
   - A. Uses: Staff development, for mainstreaming, career guidance for handicapped and non-handicapped students.
   - B. Modes: 1) Classroom--science, math, health, social studies, 2) Career guidance center, 3) guidance counselor's office, 4) special education resource room, 5) library media center, 6) special local and statewide schools for the

deaf, blind and multi-handicapped.

2. Rehabilitation Centers (visual, hearing and orthopedic).

   A. Uses: Staff development, career guidance.

   B. Modes: 1) Rehabilitation counselor, client, evaluation, field offices.

3. Colleges & Universities.

   A. Uses: Staff development, instruction, guidance.

   B. Modes: Special education, science education, rehabilitation counseling, special services for the handicapped, placement office, freshman orientation, libraries, career guidance center.

4. Regional Offices, Library of Congress, Division for Handicapped

5. Public Libraries

6. Other

It is important to note that project products can also be used by non-handicapped individuals interesting in pursuing a science-related career. To our knowledge, the 228 career briefs, (Print, microfiche , and audiotape versions), are the only collection of science-related career information available in a single package. The soundfilmstrips may also be used for the pre and inservice training of teachers, guidance counselors and rehabilitation personnel, because of the focus on the non-stereotyped and highly positive handicapped role models.

RECOMMENDATIONS AND CONSIDERATIONS FOR FURTHER STUDY

1. SCI-PHI materials and processes need to be field tested and evaluated in a variety of settings for at least nine months and revised based on more extensive evaluative findings.
2. The project products need to be systemitized into a total career guidance package including the following sequential elements:
   A. Self-Exploration - a focus on the individual's values, strengths, weaknesses, attitudes, likes, dislikes, abilities, stereotypical misconceptions, physical assets and liabilities, etc.
   B. Conceptual Exposure to Work - through a general understanding of the nature of work, work function, work roles and the vocabulary associated with work.
   C. Occupational Information - the multi-media factual information about science-related occupations and careers needed for problem solving and decision making.
   D. Experiential Exposure to Role Models - (a) Vicariously in filmstrip, pictures, audio tapes, etc.,(b) Big Brother-Big Sister Peer Guidance strategies, (c) Work simulation, (d) Science-related job experience.
   E. Placement - with industry or government positions in Science-related fields.
3. SCI-PHI products and processes need to become more of the career guidance strategies used in our schools and rehabilitation facilities.
4. A more detailed Typical Worker Task Analysis of each job needs to be conducted and evaluated.
5. A guidance strategy and associated materials need to be developed, especially for use with the Typical Worker Task Analysis section of each career brief.
6. Additional filmstrips in each of the 10 Science Clusters need to be developed, with emphasis on more entry level science jobs and younger role models.

7. Science Guides similar to the guide developed by this project for the visually handicapped need to be developed for those with auditory and orthopedic handicaps.
8. Edited transcripts of interviews with handicapped scientists, conducted by this project to produce filmstrip narratives, need to be produced.
9. Filmstrips should be produced in a captioned version for those with severe hearing handicaps.
10. The Glossaries developed by this project for use by those with severe handicaps need to be further evaluated.

DISSEMINATION

The following steps have been taken as of October 31, 1978 to disseminate the Products and findings of the Project SCI-PHI nationally.

1. Live Presentations by Director (National)
   A. NSTA Science for the Handicapped Conference, (Washington, D.C.)
   B. The National Consortium of Career Information Services, Annual Meeting, (Oklahoma City).
2. Live Presentations (State and Local)
   A. Lions Clubs, (Thomasville, Ga.)
   B. Council for Exceptional Children, (Atlanta, Ga.)
   C. Thomas County School Board and Staff (3), (Thomasville, Ga.)
   D. Florida Association of Rehabilitation Facilities Directors, Annual Meeting, (Clearwater Beach, FL.)
3. T.V. and Radio Presentations
   A. Savannah, Georgia
   B. Today Show, WNBC, Frank Fields, (NYC, NY)
   C. PSA's distributed Nationally (TV and Radio)

4. Articles about SCI-PHI

   A. Newspaper

      1. Thomasville Times-Enterprise (4)

      2. Thomasville Courier (2)

   B. Career Education Journals

      1. Special Education News

      2. Career Education News

      3. Chemistry and Engineering News

      4. FLOICC and Florida State Rehabilitation Service's "Hot Line"

      5. Soil Conservation Society of America News

      6. Science Education News, AAAS

      7. Other

5. Correspondence and Telephone Communications

   A. All of the following groups have been contacted regarding SCI-PHI and its availability from Thomas County Schools.

      1. State Directors of Deaf & Blind Services

      2. All private organizations dealing with the handicapped

      3. Special Education and Rehabilitation Counseling Department Heads at all major colleges and universities.

      4. State Department of Education Special Education and Science Coordinators.

6. All project products will be distributed nationwide by Thomas County Schools, on a cost-reimbursal basis.

APPENDIX I

SCI-PHI JOB TITLES
(Science Career Information for the Physically Handicapped Individual)

The following list of 228 science-related occupations have been produced in large print, audio tape, microfiche and Braille. The job titles have been divided into the ten occupational clusters described below. (An asterisk (*) following the job title indicates that this occupation is depicted on a SCI-PHI filmstrip.)

ARCHITECTURE AND TOPOGRAPHY CAREERS

This cluster includes occupations concerned with the design, construction, safety and usefulness of buildings and related structures. This group also contains occupations dealing with landscaping and our earth's physical features.

Architects*
Landscape Architects
Core Analysts
Mines-Safety Engineers
Mining Engineers
Petroleum Engineers
Soils Engineers
Geographers
Geologists
Geophysicists
Marine Geophysicists
Land Surveyors
Map Editors
Extractive Metallurgists
Foundry Metallurgists
Physical Metallurgists
Geological Oceanographers
Paleontologists
Petrologists
Seismologists
Soils Conservationists
Soils Scientists*
Stratigraphers

COMPUTER AND MATHEMATICS CAREERS

This cluster includes occupations concerned with computers and mathematics. Mathematics and computers are frequently used to solve problems in science, engineering and management.

Actuaries
Biostatisticians*
Computer-Design Engineers*
Demographers
Engineering Analysts
Mathematical Technicians
Mathematicians*
Engineering & Scientific Programers*
Applied Statisticians
Mathematical Statisticians
Business Electronic Data Processing Analysts*
Electronic Data Processing Systems Engineers

COUNSELING AND VOCATIONAL REHABILITATION CAREERS

This cluster includes occupations concerned with psychology and rehabilitation careers. Psychologists study the normal and abnormal behavior of living things. Counselors help people to understand themselves, their handicaps, and their opportunities.

Career Planning & Placement Officers
Coordinator of Vocational Rehabilitation Services*
Counselors*
Vocational Rehabilitation Counselors
Occupational Therapists
Clinical Psychologists*
Developmental Psychologists
Engineering Psychologists
Experimental Psychologists
Industrial Psychologists
School Psychologists
Social Psychologists
Psychometrists

EDUCATION CAREERS

This cluster includes occupations concerned with education in our public schools, colleges, universities and at other locations. Teaching is the largest of the professions. Many scientists, engineers, physicians, and graduate students are also part-time teachers.

College or University Department Heads
College or University Faculty Members*
County Agriculture Agents
Teaching Dietitians
Financial Aid Officers
Home Economists
Nutritionists
Park Naturalists
Teachers of the Blind*
Teachers of the Deaf
Elementary School Teachers
Teachers of the Handicapped
Secondary School Science Teachers*
Special Education Teachers
Vocational Agriculture Teachers

ENGINEERING CAREERS

This cluster includes occupations which deal with the art and science of using science to solve practical problems. Engineers solve design, construction and operation problems. They are involved with roads, bridges, buildings, machinery, lighting, heating and/or communications.

Accelerator Operators
Aerodynamists
Drafters
Aeronautical Engineers
Agricultural Engineers
Air-Conditioning Engineers
Automotive Engineers
Biomedical Engineers
Ceramic Engineers
Chemical Engineers
Computer-Applications Engineers
Construction Engineers
Efficience Engineers
Electrical Engineers*
Electrolysis-and Corrosion-Control Engineers
Electronics Engineers
Factory Lay-Out Engineer
Fire-Prevention Research Engineers
Heating Engineers
Highway Engineers
Industrial Engineers*

ENGINEERING CAREERS Cont'd

Industrial-Health Engineers
Industrial-Power Engineers
Manufacturing Engineers
Marine Engineers
Mechanical Engineers
Missile-Test Engineers
Nuclear Engineers
Power-Plant Engineers
Quality-Control Engineers
Refrigeration Engineers
Rocket-Engine-Test Engineers
Safety Engineers
Sanitary Engineers
Time-Study Engineers
Industrial-Traffic Managers
Internal-Combustion-Engine Designers
Methods Engineers, Chief
Technical Illustrators
Production Planners
Quality-Control Directors
Aeronautical Technicians
Aerospace Technicians*
Agricultural-Engineering Technicians
Analytical-Research Technicians
Electrical Technicians
Electronics Technicians
Industrial-Engineering Technicians
Mechanical-Engineering Technicians
Quality-Control Technicians

HEALTH, RESEARCH AND MEDICAL TECHNOLOGY CAREERS

This cluster includes occupations which deal with providing health services to sick or injured people. Most of the occupations in this group include physicians working in research and medical technicians who work with sophisticated diagnostic tools and techniques.

Audiometrists
Cytotechnologists
Therapeutic Dietitians
Health Physicists
Hospital Administrators
Industrial Hygienists
Medical Laboratory Assistants
Radiologists*
Research Physicians*
Sanitarians
Dental Laboratory Technicians
Electrocardiograph Technicians
Electroencephalograph Technicians
Chief Radiologic Technician
Surgical Technician
Biochemistry Technologists
Blook Bank Technologists
Hematology Technologists
Medical Technologists*
Medical Technologist Teaching Supervisor*
Microbiology Technologists
Nuclear Medical Technologists
Radiologic Technologists
Serology Technologists
Tissue Technologists

LIFE SCIENCE CAREERS

This cluster includes occupations which are concerned with living things. Life Scientists study living organisms and how they function. They are involved with the origin and preservation of life, from the smallest cell to the largest animal.

Agricultural-Chemical Sales Representatives
Agronomists*
Anatomists
Animal Ecologists
Animal Husbandry
Animal Scientists
Animal Taxonomists
Aquatic Biologists
Biochemists*
Biologists*
Biophysicists
Botanists
Cytologists
Dairy Technologists
Dietitians

LIFE SCIENCE CAREERS cont'd

Dietitians, Administrative
Dietitians, Chief
Entomologists*
Food Technologists
Foresters
Forestry Technicians
Game, Fish & Wild Life Specialists
Geneticists
Herpetologists
Horticulturists
Ichthyologists
Invertebrate Zoologists
Mammalogists
Medical Bacteriologists
Microbiologists*
Mycologists
Research Nutritionists
Oceanographers
Ornithologists
Pharmacists
Pharmacologists
Physiologists
Poultry Scientists
Range Managers
Seed Analysts*
Wood Technologists
Zoologists

PHYSICAL SCIENCE CAREERS

This cluster includes occupations concerned with astronomy, chemistry, physics, weather, rocks, crystals and minerals.

Astronomers
Chemical Analysts
Chemical Laboratory Chiefs
Chemical Laboratory Technicians
Agricultural Chemists
Dye Chemists
Food Chemists
Inorganic Chemists*
Organic Chemists
Water Purification Chemists
Climatologists
Crystallographers
Laboratory Assistants
Laboratory Supervisors
Meterologists
Mineralogists
Physicists*
Acoustics Physicists
Atomic & Molecular Physicists
Electricity & Magnetism Physicists
Electronic Physicists
Heat Physicists
Light Physicists
Theoretical Physicists

Technical Forecasters*

SOCIAL SCIENCE CAREERS

This cluster includes occupations concerned with the study of economics, government, history, geography, language, and social livings. Social Scientists study all aspects of human society...from the origins of man to the latest election returns.

Anthropologists*
Archeologists
Economic Geographers
Economists
Historians
Scientific Linguists*
Market-Research Analysts
Political Scientists*
Social Workers*
Sociologists*

Welfare Counselors

WRITING AND LIBRARY CAREERS

This cluster includes occupations concerned with the writing and editing of books and journals. It also deals with careers in libraries and museums. Our society is in the middle of an information explosion. Writers, librarians and museum personnel help produce, collect, organize and display this information.

Archivists
Catalogers
Curators
Technical or Scientific Publications Editor*
Librarians*
Medical Librarians
Reference Librarians
Library Directors
Medical Illustrators
Museum Technicians*
Technical Publications Writers*

SAMPLE CAREER BRIEF

DOT No.: 041.081
041.061-050

No. 162

Job Title: GENETICISTS

GENETICISTS STUDY HEREDITY AND THE MANNER IN WHICH BIOLOGICAL CHARACTERISTICS ARE PASSED FROM ONE GENERATION TO ANOTHER. THEY ARE INTERESTED IN THE IMPROVEMENT OF SUCH PLANT AND ANIMAL BREEDS AS CEREAL OR TOBACCO CROPS, DAIRY CATTLE, OR POULTRY. THEY ARE USUALLY CLASSIFIED AS AGRONOMISTS OR ANIMAL SCIENCE SPECIALISTS.

THEORETICAL GENETICISTS SEARCH FOR THE BASIC LAWS OF HEREDITY. THEY CONDUCT EXPERIMENTS WITH ANIMALS OR PLANTS.

GENETICISTS MAY SPECIALIZE IN A PARTICULAR BRANCH OF GENETICS, SUCH AS MOLECULAR OR POPULATION GENETICS. SOME GENETICISTS, MAY DO HUMAN GENETIC COUNSELING OR MEDICAL GENETICS.

SCI-PHI
Science Career Information for the Physically Handicapped Individual

Developed by:

Thomas County Schools
Post Office Box 440
Thomasville, GA 31792

This project is supported by a National Science Foundation grant under the Physically Handicapped in Science Program (1977-1978).

Career and Educational Preparation:

WHILE IN HIGH SCHOOL, ONE SHOULD ENROLL IN AS MANY BIOLOGICAL SCIENCE COURSES AS POSSIBLE. COURSES SUCH AS CHEMISTRY, PHYSICS, GENERAL BIOLOGY, BOTANY, AND ZOOLOGY WOULD BE MOST HELPFUL.

SINCE THIS OCCUPATION IS A SPECIALITY OF THE BIOLOGIST'S FIELD, ONE SHOULD GET A BACHELOR'S DEGREE IN ONE OF THE BIOLOGICAL SCIENCES AND A SPECIALITY IN GENETICS WHILE IN GRADUATE SCHOOL.

Working Conditions:

GENETICISTS USUALLY WORK IN A LABORATORY SETTING. OTHERS MAY ALSO BE ENGAGED IN OUTDOOR FIELD RESEARCH WORK AND ARE FREQUENTLY REQUIRED TO PARTICIPATE IN VIGOROUS PHYSICAL ACTIVITY.

Typical Worker Tasks:

	Typical Time Spent in Activity		
	Little or None (Less than 10%)	Some (10% to 50%)	Much (Over 50%)
1. Looking through some form of lens	X		
2. Reading gauges, meters or similar devices	X		
3. Walking inside a building		X	
4. Traveling within a given city or area	X		
5. Traveling to various cities or areas		X	
6. Traveling in areas accessible only by foot, horseback or boat		X	
7. Talking with co-workers and/or the public, in person		X	
8. Talking on the telephone		X	
9. Working with colleagues on a team project		X	
10. Supervising other people		X	
11. Reading reports, papers, articles, books, etc.		X	
12. Writing reports, papers, articles, books, etc.		X	
13. Reading and interpreting illustrations, diagrams or tables		X	
14. Producing illustrations, diagrams or tables		X	
15. Operating audio-visual equipment	X		
16. Lifting and carrying objects weighing more than 20 pounds	X		
17. Doing delicate handwork		X	
18. Using dangerous machinery or chemicals	X		
19. Working in the vicinity of dangerous machinery or chemicals	X		

Earnings and Employment Outlook:

THE EMPLOYMENT OUTLOOK FOR GENETICISTS IS EXCELLENT. OPPORTUNITIES ARE FAVORABLE FOR THOSE WITH ADVANCED DEGREES.

BEGINNING GENETICISTS EARN FROM $800 TO $1,400 PER MONTH.
EXPERIENCED GENETICISTS EARN FROM $1,125 TO $2,200 PER MONTH.

Career Ladder:

PROJECT DIRECTORS OF RESEARCH

*GENETICISTS

GENETICISTS' AIDES

GENETICISTS' TRAINEES

Sources of Additional Information:

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES
3900 WISCONSIN AVENUE, NW
WASHINGTON, DC 20016

THE FOLLOWING PAGES REPRESENT THE GENERAL FORMAT FOR EACH OF THE EIGHTEEN BRAILLE VOLUMES. ALL TOGETHER THERE ARE 228 SCIENCE-RELATED CAREER BRIEFS IN BRAILLE.

Science Career Information for the Physically Handicapped Individual

DEVELOPED BY:
Thomas County Schools
Post Office Box 440
Thomasville, GA 31792

PROJECT SUPPORTED BY:
National Science Foundation Grant

TRANSCRIBED IN ENGLISH BRAILLE
BY:
Temple Sisterhood Braille Group
Jacksonville, Florida

IN VOLUMES
VOLUME
PAGES AND

Under the Sponsorship of
Temple Sisterhood
Jacksonville, Florida
1978

CONTENT PAGE(S)

SCI-PHI

THIS CLUSTER INCLUDES .....

.....

.....

.....

CODE	JOB TITLE	PAGE
1.	ARCHITECTS - FILMSTRIP AVAILABLE	
2		
3.		
4.		
5.		
6.		
.		
.		
.		

* Note: All 228 job titles are also indexed alphabetically according to the volume in which they are located. This master index is located in a separate volume.

SCI-PHI

EDUCATION PREPARATION

WORKING CONDITIONS

SCI-PHI

JOB BRIEF

NO_____

DOT # ABC.DEF

ABC.DEF-GHI

JOB TITLE:_____

JOB DESCRIPTION...

SCI-PHI

TYPICAL WORKER TASKS

TYPICAL TIME SPENT

LITTLE OR NONE MUCH SOME

X_____

X_____

X_____

X_____

X_____

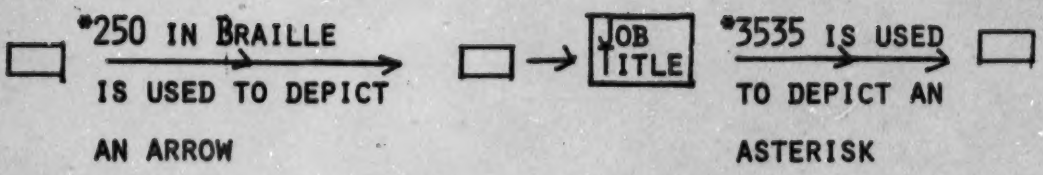
EACH SENTENCE WILL START IN THE COLUMN CORRESPONDING TO THE TYPICAL TIME SPENT

X_____

X_____

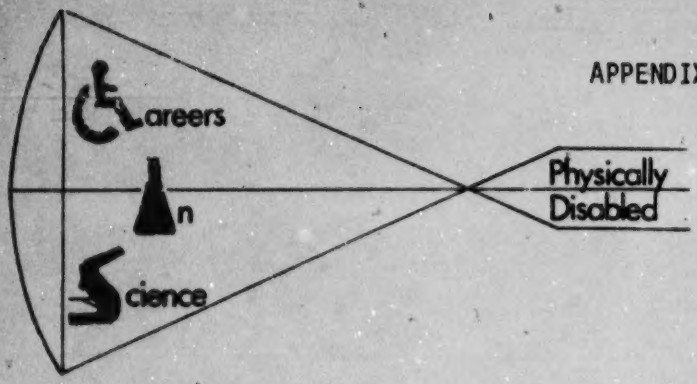
EARNING AND EMPLOYMENT OUTLOOK

CAREER LADDER



SOURCES OF ADDITIONAL INFORMATION

(STATES NOT ABBREVIATED
IN ADDRESS)



APPENDIX II

Thomas County Schools
P. O. Box 440
Thomasville, GA 31792
Phone: 912-226-7102

Neal Berger, Project Dir.

Dear

Last year a national telephone survey was conducted by the Thomas County Schools to determine the need for career guidance materials designed specifically for people with visual, hearing or orthopedic handicaps. Based on the results of this survey, a grant proposal was written and submitted to the National Science Foundation. This proposal was one of eleven selected nationwide for funding by NSF.

Today, we are in the process of designing and field testing a complete career guidance system aimed at attracting handicapped youngsters and adults into careers in science. Among the products being developed are the television PSA's enclosed in the package. Their purpose is two-fold:

1. To encourage handicapped youngsters and adults to investigate science careers
2. To inform vocational rehabilitation counselors, guidance counselors, teachers and the public about science career opportunities for the physically handicapped.

We are proud to have been selected to develop these most needed materials. We feel they reflect positively on our school system, our community, and our state.

The materials we have enclosed include:

1. A color video tape including two 60 sec, a 30 sec, 20 and 10 sec spots
2. Transcripts of the spots
3. An optional recording log to assist in keeping track of PSA air time.

(continued on next page)

This project is supported by a National Science Foundation grant under the Physically Handicapped in Science Program.

Our school system and the National Science Foundation have gone to considerable expense to develop these spots and we sincerely hope that you will help us as much as possible with this important message. There is a world of largely untapped potential in our handicapped population. Won't you help us aid them in achieving this potential?

Thank you.

Sincerely,

Neal H. Berger

Neal H. Berger
Project Director

NHB/dm

Enclosures

T.V. PSA's (60 second)

John Gwaltney: "I'm an Anthropologist. I worked among non-literate cultures in highland Mexico and Jamaica. I teach others my science. I'm blind."

Michael Hudecki: "I am a neuro-muscular researcher. I am studying muscular dystrophy. I have muscular dystrophy myself."

Judy Annis: "I am a Medical Lab Technician. I am deaf."

Announcer: "Each of these people has a career in science, yet each has overcome a personal challenge, a handicap. Today there are hundreds of physically disabled scientists working in challenging and interesting careers. Careers that you too can be successful in. Don't let a handicap hold you back from a science career. There are too many other challenges that need to be met. Check with your school or rehabilitation counselor about careers in science. Do it today."

T.V. PSA's (60 second)

Announcer: "Dr. John Gwaltney is an Anthropologist. He has studied non-literate cultures in Mexico and Jamaica and is teaching others his science. He is blind."

"Miss Judy Annis is a Medical Lab Technician. She performs tests for a health maintenance organization, helping to keep people well. She is deaf."

"Dr. Michael Hudecki does neuro-muscular research. He is looking for the answers to the problem of muscular dystrophy. He has muscular dystrophy."

"Each of these people has a career in science, yet each has overcome a personal challenge, a handicap. Today there are hundreds of physically disabled scientists working in challenging and interesting careers. Careers that you too can be successful in. Don't let a handicap hold you back from a science career. There are too many other challenges that need to be met. Check with your school or rehabilitation counselor about careers in science."

T.V. PSA's (30 second)

Announcer: "Dr. John Gwaltney is an Anthropologist. He is blind. Miss Judy Annis is a Medical Lab Technician. She is deaf. Dr. Michael Hudecki does neuro-muscular research. He has muscular dystrophy. Each of these people has a career in science, yet each has overcome a personal challenge, a handicap. Don't let a handicap hold you back from a science career. Ask your school or rehabilitation counselor about careers in science."

T.V. PSA's (20 second)

Announcer: "An Anthropologist who is blind. A Medical Lab Technician who is deaf. A neuro-muscular researcher who has muscular dystrophy. Hundreds of disabled persons have become scientist and so can you."

T.V. PSA's (10 second)

Announcer: "Each of these people is a scientist and each has a handicap. Hundreds of disabled persons have become scientists and so can you."

*For more information contact:

Careers In Science
Thomas County Schools
Thomasville, GA 31792

This message supported by a
National Science Foundation Grant.

SCI-PHI Television PSA Log +
Thomas County Schools
P.O. Box 440
Thomasville, GA 31792

Television Station _____

Address _____

Telephone No: _____ Contact Person: _____

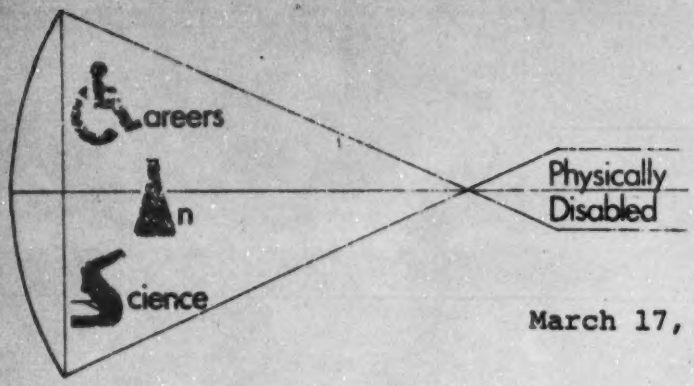
PSA Length					Date on Air	Time
60 sec.	60 sec.*	30 sec.	20 sec.	10 sec.		

*Narrator only
+Optional, for your convenience

TELEVISION P S A LOCATIONS

Phoenix, Arizona	KOOL-TV	KOOL-TV (CBS) 511 W. Adams Phoenix, Arizona 85003
Syracuse, NY	WSYR-TV	WSYR-TV (NBC) 1030 James St. Syracuse, NY 13203
San Francisco, CA	KRON-TV	KRON-TV (NBC) Box 3412 1001 Van Ness Ave. San Francisco, CA 94114
Baltimore, Maryland	WBAL-TV	WBAL-TV (NBC) 3800 Hooper Avenue Baltimore, Maryland 21211
Denver, Colorado	KBTV	KBTV (ABC) 1089 Bannock St. Denver, Colorado 80217
Houston, TX	KPRC-TV	KPRC-TV (ABC) Box 2222 Houston, TX 77001
Seattle, WA	KING-TV	KING-TV (NBC) 320 Aurora Ave. N. Seattle, WA 98109
Washington, DC	WJLA-TV	WJLA-TV (ABC) 4461 Connecticut Ave. N. W. Washington, DC 20008
Chicago, IL	WBBM-TV	WBBM-TV 630 N. McClung Court Chicago, IL 60611
Philadelphia, PA	KYW-TV	KYW-TV Independence Mall East Philadelphia, PA 19106
Raleigh, NC	WRAL-TV	WRAL-TV Box 12000 Raleigh, N. C. 27605
Indianapolis, IN	WISH-TV	WISH-TV 1950 N. Meridian St. Indianapolis, IN 46207
Boston, Mass.	WBZ-TV	WBZ-TV 1170 Soldiers Field Rd. Boston, Mass. 02134

Albany, GA	WALB-TV	WALB-TV Box 3130 Albany, Ga. 31706
Atlanta, Ga.	WETV	WETV 740 Bismarck Rd. N. E. Atlanta, GA. 30324
Macon, GA.	WMAZ-TV	WMAZ-TV Box 5008 Macon, GA 31208
Savannah, GA	WTOC-TV	WTOC-TV Bxo 8086 Savannah, GA 31402



Thomas County Schools
P. O. Box 440
Thomasville, GA 31792
Phone: 912-226-7102

Neal Berger, Project Dir.

March 17, 1978

Dear Program Director:

Last year a national telephone survey was conducted by the Thomas County Schools to determine the need for career guidance materials designed specifically for people with visual, hearing or orthopedic handicaps. Based on the results of this survey, a grant proposal was written and submitted to the National Science Foundation. This proposal was one of eleven selected nationwide for funding by NSF.

Today, we are in the process of designing and field testing a complete career guidance system aimed at attracting handicapped youngsters and adults into careers in science. Among the products being developed are the radio PSA's enclosed in this package. Their purpose is two fold:

1. To encourage handicapped youngsters and adults to investigate science careers
2. To inform vocational rehabilitation counselors, guidance counselors, teachers, and the public about science career opportunities for the physically handicapped.

We are proud to have been selected to develop these most needed materials. We feel they reflect positively on our school system, our community, and our state.

The materials we have enclosed include:

1. Reel to Reel 1/4" audio tape including a 30 sec., 20 sec. and two 10 sec. spots (speed 7½)
2. Transcript of the audio tapes
3. Additional "announcer only" script
4. A recording log to assist us in keeping tract of PSA air time.
5. Laminated optional announcer tag.

This project is supported by a National Science Foundation grant under the Physically Handicapped in Science Program.

Our school system and the National Science Foundation have gone to considerable expense to develop these spots and we sincerely hope that you will help us as much as possible with this important message. There is a world of largely untapped potential in our handicapped population. Won't you help us aid them in achieving this potential?

Thank you.

Sincerely,

Neal H. Berger

Neal H. Berger
Project Director

NHB/dm

Enclosures

SCRIPT I (30 seconds)

John Gwaltney: "Look, if you think you would like to be a scientist, don't let a physical handicap deter you in trying to realize this goal. My name is John Gwaltney. I'm blind, I wanted to be an anthropologist and that's what I'm doing now."

Announcer: "Don't let a handicap hold you back from a career in science. This message was made possible by a grant from the National Science Foundation."

SCRIPT II (20 seconds)

John Gwaltney: "Look, if you think you would like to be a scientist, don't let a physical handicap deter you in trying to realize this goal. My name is John Gwaltney. I'm blind, I wanted to be an anthropologist and that's what I'm doing now."

Announcer: "Don't let a handicap hold you back from a career in science. Hundreds of disabled people have made it, and so can you. Ask you school or rehabilitation counselor about science careers. This message was made possible by a grant from the National Science Foundation.

SCRIPT III (10 seconds)

John Gwaltney: "Look, if you think you would like to be a scientist, don't let a physical handicap deter you. My name is John Gwaltney, I'm blind, I wanted to be an anthropologist and that's what I'm doing now."

SCRIPT IV (10 seconds)

Announcer: "Thinking about a career in science? Don't let a handicap stop you. The National Science Foundation reminds us that hundreds of disabled persons have made science a career."

OPTIONAL ANNOUNCER TAG

Are you thinking about a career in science? Well, don't let a physical handicap stop you. The National Science Foundation reminds us that hundreds of orthopedic, visual and hearing handicapped persons have made science a career...and so can you. See your school or rehabilitation counselor for details.

SCI-PHI Radio PSA Log +
Thomas County Schools
P.O. Box 440
Thomasville, GA 31792

Radio Station _____

Address _____

Telephone No: _____ Contact Person: _____

PSA Length				Date on Air	Time
30 sec.	20 sec.	10 sec.	10 sec.*		

NATIONWIDE RADIO P S A LOCATIONS

Washington, DC	WASH	WASH 5151 Wisconsin Ave., N. W. Washington, DC 20016
New York City, NY	WCBS	WCBS 51 W. 52nd St. New York City, NY 10019
Syracuse, NY	WDDS - FM	WDDS - FM Box 1390 Eastwood Station Syracuse, NY 13206
Chicago, IL	WCGO	WCGO 119 Olympia Plaza Chicago, IL 60411
Los Angeles, CA	KABC & KLDS-FM	KABC & KLDS - FM 3321 S. LaAenega Blvd. Los Angeles, CA 90016
San Francisco, CA	KSFX-FM & KGO	KSFX-FM & KGO 1177 Polk Street San Francisco, CA 94109
Houston, TX	KPRC	KPRC Box 2222 Houston, TX 77001
Miami, FL	WWOK	WWOK Box 450577 Shenandoah Station Miami, FL 33145
Jacksonville, FL	WJAX	WJAX Box 1740 Jacksonville, FL 32201
New Orleans, LA.	WRNO	WRNO Box 6071 3400 N. Causeway Blvd. New Orleans, LA 70121
Seattle, WA	KING	KING 320 Aurora Ave. North Seattle, WA 98109
Ann Arbor, MI	WAAM	WAAM Box 1600 Ann Arbor, Mich. 48106

GEORGIA RADIO P S A LOCATIONS

Valdosta, Ga.	WAFT	Jack Tidwell Box 338 Valdosta, Ga. 31601
Valdosta, Ga.	WGOV	Mary Carter P. O. Box 1207 Valdosta, Ga. 31601
Atlanta, Ga.	WGST	Mrs. Joanne Harrison 550 Pharr Rd. N. E. Atlanta, Ga. 30305
Atlanta, Ga.	WIGO	Randy Humphries 1422 W. Peachtree N. E. Atlanta, Ga. 30307
Garden City, Ga.	WNMT	Chris Watkins Box 7042 Garden City, Ga. 31408
Augusta, Ga.	WAUG	Mark Bell P. O. Box 669 Augusta, Ga. 30903
Warner Robbins, Ga.	WQCK	Ray Thomas P. O. Box 2968 Warner Robbins, Ga. 31093
Douglasville, Ga.	WPGL	Mel Coe 8470 Hospital Dr. Douglasville, Ga. 30134
Macon, Ga.	WBML	Paulette Teiken P. O. Box 6298 Macon, Ga. 31208

APPENDIX III

Project SCI-PHI
(Science Career Information for Physically Handicapped Individuals)

Role and Scope of the National Science Advisory Board
October 28, 1977

NAME:

The name of this advisory board shall be the SCI-PHI National Science Advisory Board.

PURPOSE:

The basic purpose of this advisory council shall be to advise the project staff in formulating a high quality science career information system for physically disabled youths and adults. More specifically, the Advisory Board will be asked to:

A. Participate in a survey to help prioritize the suitability of various science careers to include in our career information materials, and to assess the relative difficulty level handicapped individuals may encounter in various science careers.
B. Review, and help verify project products.
C. Advise project staff regarding the field testing of the project developed materials.
D. Discuss issues related to the development of project products and procedures.
E. Assist project staff in describing or explaining the SCI-PHI project to selected individuals and groups.
F. Assist in the evaluation of the project's developmental processes and products.
G. Upon their consent, members may serve as a role model for filmstrip and/or audio tape for project materials.
H. Help us to contact other disabled scientists and/or organizations which can help with materials production.

MEMBERSHIP:

Twenty-five disabled scientists, three nationally known science educators, and three State Rehabilitation specialists, (one from each target disability group) will be selected with the assistance of members of the project's Core Planning Team. An attempt will be made to locate representative scientists from major scientific fields and target disabilities.

Members of the NSAB will be appointed by the Project Director and will serve for the duration of the grant funded period, (through June 30, 1978).

MEETINGS:

There are no scheduled meetings for the NSAB. Business will be conducted primarily by telephone and mail.

ADMINISTRATION:

The NSAB activities will be coordinated by the Project Director, Neal H. Berger, with the assistance of Terence Thompson, Project Coordinator. The Core Planning Team will assist the Project Staff as may be deemed necessary.

COMMITTEES:

The Director may appoint ad hoc committees from time-to-time to review special materials and/or examine special issues in their area of expertise, or disability.

Members of SCI-PHI National Science Advisory Board

Hadi Madjid
82 Powers Road
Concord, MA 01742
(617)864-5770

Charles R. Poor
Director
Vocational Rehabilitation
Texas Institute for Rehab. & Research
1333 Moursund Avenue
Houston, Texas 77030
(713)797-1440

Miss Florence M. Cook
Education Coordinator
School of Medical Technology
Jersey Shore Medical Center
Neptune, NJ 07753
(213)775-5500

Dr. Howard Greenberg
1115 Emerson Avenue
Teaneck, NJ 07665

Dr. Nansie Sharpless
Assistant Professor
Albert Einstein College of Medicine of Yeshiva Univ.
1300 Morris Park Avenue
Bronx, NY 10461
(212)430-2000

Dr. Robert P. Williams
Professor
Dept. of Microbiology & Immunology
Baylor College of Medicine
Texas Medical Center
Houston, Texas 77030
(713)790-4472

Dr. Carole Eberly
Psychology Dept.
Richmond VA Hospital
Richmond, VA 23249

Dr. Judith Pachciarz
Asst. Prof. Vet. Science
University of KY
Lexington, KY 40506

Dr. M. Clinton Miller III
Professor & Chairman
College of Medicine
Dept. of Biometry
Medical Univ. of South Carolina
80 Barre Street
Charleston, SC 29401
(803)792-2261

Richard Stolper
29 Hawthorne Street
White Plains, NY 10603
(914)949-8142

Dr. Robert Rehwoldt
Director
Marist College Research Institute
Poughkeepsie, NY 12601
(914)471-3240

Dr. Myron H. Weinberger
Professor of Medicine
Director, Specialized Center of Research in Hypertension
Indiana Univ. School of Med.
1100 West Michigan Street
Indianapolis, Indiana 46202

Lex Frieden
New Options Research Director
Texas Institute for Rehab & Research
1333 Moursund Avenue
Houston, Texas 77030
(713)797-1440

Dr. Samuel M. Genensky
Director of the Center for the Partially Sighted
Santa Monica Hosp. Med. Center
1225 Fifteenth Street
Santa Monica, CA 90404
(213)451-1511

Dr. C. Benjamin Graham
Professor of Radiology &
Pediatrics
University of Washington
Seattle, Washington 98195
(206)543-3320

Dr. Joseph R. Larson
Director
School of Life Sciences
Univ. of Illinois at Urbana-
Champaign
387 Morrill Hall
Urbana, Illinois 61801
(217)333-3044

Dr. Michael J. Tremelling
Assistant Professor
Dept. of Chemistry
Vassar College
Poughkeepsie, NY 12601

H. Wayne Pritchard
2724 61st Street
Des Moines, Iowa 50322
(515)289-2331

Dr. Donald Sellin
Professor, Special Education
Western Michigan Univ.
College of Education
Kalamazoo, Michigan 49001
(616)383-1680

Dr. James Slagle
Code 5407
Naval Research Laboratory
Washington, DC 20375

Robert J. Bibbero
417 Meadow Lane
Merion Station, PA 19066

Dr. Betty Davidson
Thyroid Research Lab
The Massachusetts General Hosp.
Boston, Mass 02114
(617)726-3874

Dr. Rolf-Helmut Ehrmann
1446 Gardent Street
Park Ridge, Illinois 60068
(312)825-0408

Dr. Geerat J. Vermeij
Department of Zoology
University of Maryland
College Park, Maryland 20742
(301)45403201

Dr. John J. Gavin
Director, Allergy Research Affairs
Miles Laboratories, Inc.
Elkhart, Indiana 46514
(219)264-8746

Samuel L. Barres
132 Sargent Street
Newton, Mass. 02158
(219)264-8214

Dr. Grace D. Napier
802 20th Street
Greeley, Colorado 80631
(303)352-2095

Dr. E. Stephen Halpert
VA Hospital
13000 North 30th Street
Tampa, Florida 33612

John L. Gwaltney
Associate Professor
Department of Anthropology
500 University Place
Syracuse, NY 13210
(315)423-4219

Dr. Michael Hudecki
3 C Homer Lane
Hicklry Hill Estates
Williamsville, NY 14221
(716)689-8428

D. Curtis Willoughby
Bldg. 7, Apt. 5
Hillside Gardens
Hillside Avenue
Rockaway, NJ 07866

APPENDIX IV. SAMPLE INTERVIEW FORMAT *

SCI-PHI

* Please tag with date and place where interview is conducted

PLEASE ADDRESS THE FOLLOWING QUESTIONS WHERE APPLICABLE:

1.) Your name

2.) Your home and business address and phone number.

3.) Your employer.

4.) Your job title

5.) What is the nature of your disability and when did it occur with relation to your career and/or training (before, after)?

6.) What is the nature of your work (describe typical work day activities)?

7.) Within your line of work, describe your area of specialization?

8.) Where did you receive your training?

9.) What special tools / procedures did you use in school to assist in your education?

10.) What special tools / procedures do you use at work to help you do your job?

11.) What special tools / procedures are used at home relative to your job?

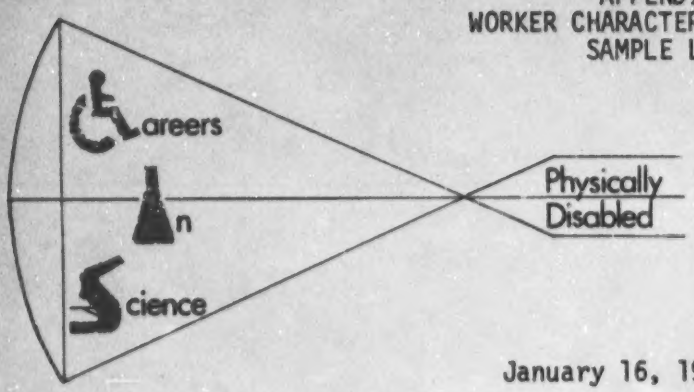
12.) How might a young, disabled student best prepare for a position in this field?

13.) What was the motivation which led you to this career?

14.) Any specialnotes of interest (a chance to "sound off")?

*Unedited audio tape cassette recordings and transcripts have been produced on interviews with approximately 60 handicapped scientists nationwide, for input into sound filmstrips.

APPENDIX V
WORKER CHARACTERISTICS STUDY
SAMPLE LETTER



Thomas County Schools
P. O. Box 440
Thomasville, GA 31792
Phone: 912-226-7102

Neal Berger, Project Dir.

January 16, 1978

This is an invitation and special request for you to join with a limited number of selected scientists nationwide, to help us gather vital information about your job activities.

Thomas County Schools have a National Science Foundation grant to develop a science career information system. This information, when compiled and analyzed, will be utilized in a special set of career guidance materials to be used by pre-vocational to adult persons. Many of the users of this information will have orthopedic visual, or hearing handicaps.

Please complete the page(s) enclosed which best describe the type(s) of work with which you are familiar. For those work areas with which you are unfamiliar, simply do not respond. Discard any sheets that contain no responses from you, and return only the completed ones in the enclosed stamped envelop provided.

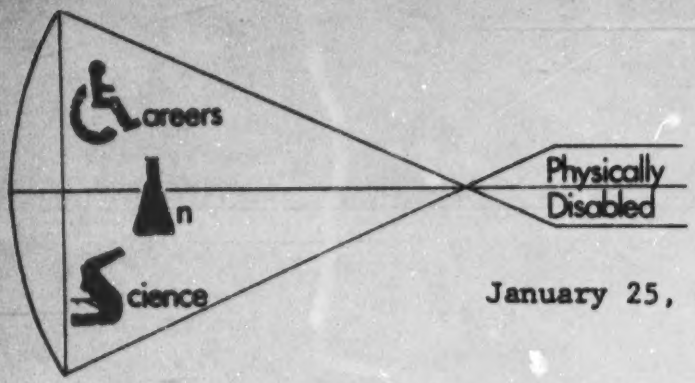
Please while you have these materials in hand, take the brief time to respond right now. This project urgently needs your assistance and these data by the end of January.

Sincerely,

Neal H. Berger
Project Director

NB/bs
Enc.

This project is supported by a National Science Foundation grant under the Physically Handicapped in Science Program.



Thomas County Schools
P. O. Box 440
Thomasville, GA 31792
Phone: 912-226-7102

Neal Berger, Project Dir.

January 25, 1978

Dear

We are in the process of completing over 200 science-related career briefs for our project. As a final part of the effort we are conducting this Science Worker Characteristics Survey. This survey is being sent to about 800 non-handicapped scientists nationwide, in a variety of careers, and to the members of our project advisory board.

The compiled results of this survey will permit any user of these materials to help make their own decision about the various science careers. It will also provide them with information about the general types of working activities an individual does at each particular job.

Please complete the enclosed survey and return it as soon as possible. Thank you for your cooperation.

Sincerely,

Neal H. Berger

Neal H. Berger
Project Director

NHB/dm

This project is supported by a National Science Foundation grant under the Physically Handicapped in Science Program.

MATHEMATICS, PHYSICAL SCIENCES, AND RELATED RESEARCH

Please complete this form if you are familiar with the type of work described below.

WORK PERFORMED CODE: _____

Work activities in this group primarily involve investigation into atmospheric, astronomical, and geographical phenomena and conditions, into theoretical aspects of physics and mathematics, and into automatic data-processing systems and programs. Typically, workers are engaged in collecting and analyzing data on the nature, composition, structure, and other features of the earth, atmosphere, and celestial bodies; in formulating theories on time, space, weather, matter and energy, motion of heavenly bodies, and other aspects of the physical world; in analyzing data-processing problems, stating problems in computer language, and determining computational methods and sequence of machine operations for solution of problems; in developing new mathematical and statistical methods, formulas, and relationships; and in communicating research findings through reports, lectures, technical publications, and other media.

Your Name: _____ Date: _____

Current Job Title(s): _____

Area of Specialization: _____

Highest Degree Obtained: _____

****

If you teach in this area indicate the approximate percent of time for:

Lecture_____ Lab_____ Research _____ Other _____

Directions: Next to each numbered activity place an "X" in the column to indicate the typical time you spend in this activity. WORKER ACTIVITIES	TYPICAL TIME SPENT IN ACTIVITY		
	Little or None (Less than 10%)	Some (10-50%)	Much (Over 50%)
1. Looking through some form of lens			
2. Reading guages, meters or similar devices			
3. Walking inside a building			
4. Traveling within a given city or area			
5. Traveling to various cities or areas			
6. Traveling in areas accessible only by foot, horseback or boat			
7. Talking with co-workers and/or the public, in person			
8. Talking on the telephone			
9. Working with colleagues on a team project			
10. Supervising other people			
11. Reading reports, papers, articles, books, etc.			
12. Writing reports, papers, articles, books, etc.			
13. Reading and interpreting illustrations, diagrams or tables			
14. Producing illustrations, diagrams or tables			
15. Operating audio-visual equipment			
16. Lifting and carrying objects weighing more than 20 pounds			
17. Doing delicate handwork			
18. Using dangerous machinery or chemicals			
19. Working in the vicinity of dangerous machinery or chemicals			
Please add other typical activities not listed above, if applicable	XXXXXXXXXXXXXXXXXXXXXXXXXXXX		

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If you have additional comments, please list them on the reverse side.

August, 1978

PROJECT EVALUATION

Conducted by:

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For the Proposal:

A Science-Oriented Career Guidance System for the Physically Handicapped

Neal H. Berger, Director
Thomas County Schools
P.O. Box 440
Thomasville, Georgia 31792

Under the National Science Foundation's Handicapped in Science Program, 1977-78

SPI 77-19915

The original evaluation design selected for the project's assessment was a modification of Danile Stufflebeam's CIPP (Content, Input, Process and Product) Model. The modification included a fifth component dealing with product Impact; therefore, the model used is referred to as the CIPPI Model.

The evaluation was made with the full involvement of project staff and the evaluator at each phase of the project's operation. In addition, the users of the project's products provided input into the evaluation. Since this was a developmental project, the evaluation process was conducted continuously and feedback was given by the valuator continuously as conduction of the project was carried out.

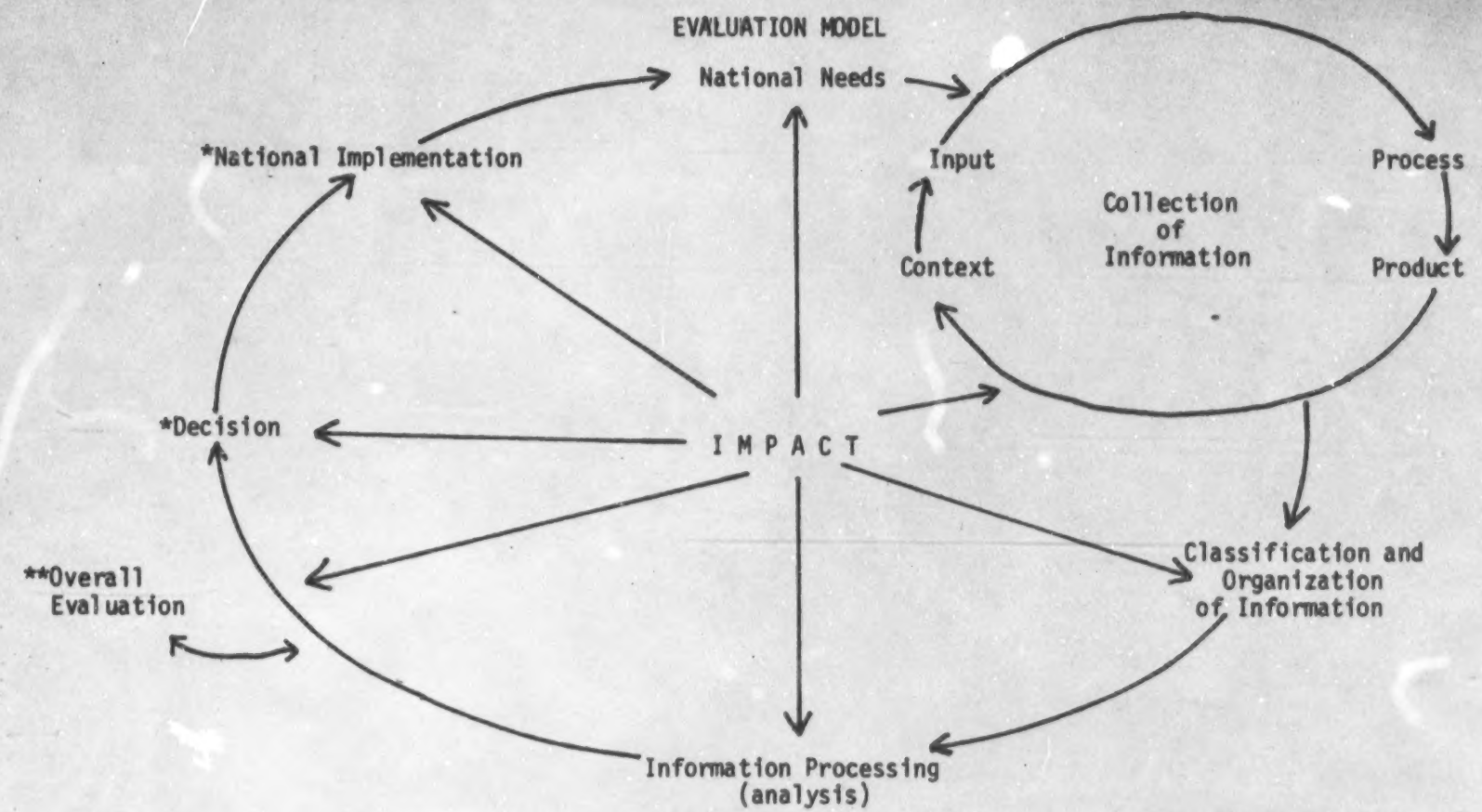
An overall diagram illustrating the operation of the CIPPI Model, with definitions, is given on the following page. In addition, a further breakdown on the model is provided on an additional page.

CIPPI EVALUATION MODEL

CONTEXT	INPUT	PROCESS	PRODUCT	IMPACT
Objective To define operation context, to identify and assess needs in the context, and to identify and delineate problems underlying the needs.	Objective To identify and assess systems, capability, available input strategies and designs for improvint the strategies.	Objective To identify or predict defects in procedural design or its implementation and to maintain a record of procedural events and activities.	Objective To relate outcomes, information to objectives and to context, input and process information.	Objective To assess the acceptance of project materials and strategies by users.
Method Describe individually and in relevant perspective major subsystems of context, compare actual and intended inputs and outputs of the subsystem and by analyzing possible causes of descrepencies between actual and intended.	Method Describe and analyze available human and material resources, solution strategies and procedural designs for relevance, feasibility and economy in the cause of action to be taken.	Method Monitor activities, potential, procedural barriers, and remain alert to unanticipated ones.	Method Define operational and measurement criteria associated with objectives by comparing measurements with predetermined standards and interpreting outcomes in terms of recorded inputs and process information.	Method Define the specific reactions of users to the project materials and strategies.
Question to be Answered What were the needs to be accomplished?	Question to be Answered How effective and realistic were the program objectives?	Question to be Answered How effective were the procedures which were used?	Question to be Answered What was produced by the program?	Question to be Answered What has been the program's impact on individuals?

DIAGRAM OF CIPPI

EVALUATION MODEL



Context - What were the needs to be accomplished. To be determined by disabled Science Advisory Committee and survey.

Input - How effective and realistic were the project objectives.

Process - How effective were the procedures which were used.

Product - What was produced by the project.

Impact - What was user's reactions to the project materials and strategies.

* To be made by National Science Foundation
** Report to be sent to National Science Foundation

CONTEXT EVALUATION RESULTS

The overall purpose of context evaluation was to define the environment in which change was to take place and to depict the need for the project. As applied to this project, context evaluation began with a conceptual analysis to identify and define the limits of the program to be developed. This step was accomplished effectively in the development of the project proposal.

The next step in context evaluation was to conduct a needs assessment. It was recognized by the project staff that a complete needs assessment of all potential users of the products of the project would be very helpful. However, due to time contraints of the project, it was determined that only sampling of expert opinions on the needs could actually be conducted. Therefore, experts such as Dr. Martha Redden, a person who had done previous work with handicapped scientists, was consulted. In addition, survey forms were sent to selected handicapped scientists and to various rehabilitation agencies to obtain their input.

In the context evaluation for the project, answers to the following questions were sought:

1. Did the project staff have a specific rationale for the program? In the proposal stage and during the early stages of the project, project staff developed a rationale which was based on the best sources of information available to them. The rationale developed was logical and sound.

2. Was the population to be served clearly defined? The target population to be served was clearly defined in the proposal. However, there were specific problems in making contacts with agencies responsible for serving the types of disabled persons to be involved in the project. This was due to the fact that many state agencies dealing with the handicapped put a low priority on the career counseling of individuals and placed a higher priority on other services.

3. Did the project staff have knowledge of what now exists in science guidance for the handicapped? The project director completed an extensive review to identify what was available and discovered very little information or materials designed for the handicapped.

4. Were the objectives of the project defined and understood by the staff? The objectives of the project were well defined in the project proposal and the project staff exhibited extensive knowledge of them.

INPUT EVALUATION RESULTS

The purpose of input evaluation was to determine how to utilize resources to meet project objectives. In the input evaluation for the project, answers to the following questions were sought:

1. Were detailed plans for each activity identified? The project proposal provided an excellent, detailed list of activities to be carried out for the project. Modifications to these proposed activities were made as the need arose.

2. Was outside assistance sought for overcoming any barriers which could not be handled internally? The project director did an excellent job of quickly identifying barriers and developing alternative procedures for overcoming them. An example of this was the action taken to insure the development of the project's filmstrips. When it was discovered that the project staff would not be able to make arrangements for making all the color slides necessary for the proposed filmstrips (due to financial and time constraints), the project director quickly came up with an alternative plan. This plan involved the hiring of consultants at locations throughout the country to photograph and conduct audio tape interviews with handicapped scientists needed for the development of the filmstrips.

3. Were project plans followed? Project plans were followed in as far as possible and when modifications were made, modifications resulted in the use of more effective procedures.

4. Were decisions made promptly and effectively? Once the project gathered momentum in its early stages, the project director was very effective and prompt in making decisions which contributed immensely to the success of the project.

PROCESS EVALUATION RESULTS

The purpose of process evaluation was to provide periodic feedback to those responsible for continuous managerial control and refinement of plans and procedures. The evaluator and project director worked cooperatively, on a continuous basis, to identify and monitor the potential sources of failure in the project.

Some specific questions which were answered in the conduction of process evaluation were:

1. How were activities accomplished? Most of the project activities were conducted as specified in the project proposal. Some of the major changes (which were made

for efficiency reasons) were:

a. Upon discovering that the project staff could not complete the filmstrip development within the specified time frame, the photography and taped interviewing were contracted to local photographers in various parts of the country. This procedure resulted in a considerable saving of time and travel expenses.

b. Due to time and expense contraints, filmstrips were not scripted for the deaf. Instead separate written scripts and glossaries were developed for the deaf viewer to use.

c. An additional delivery medium of the career briefs, in the form of microfiche, was prepared. It was believed by the project staff that since there would be funds to provide this additional delivery medium, that it should be explored. This medium was the most economical means developed for delivering the information.

d. Instead of providing information on only selected career briefs in braille and on audio tapes, all briefs were provided on these two media.

e. Additional TV and radio public service announcements were developed than were specified in the project proposal.

f. Special materials for the blind were added. These included a guide to strategies used by blind scientists at work and while at school, and a listing of special equipment used by blind scientists.

2. How were resources utilized? Due to excellent planning, project resources were utilized in a way which resulted in more products being produced than originally proposed.

3. How effective were staff members in carrying out planned activities? The effectiveness of the project director was outstanding and overall staff performance was excellent. When it was discovered that the project coordinator's performance was below what was expected, this person was encouraged to leave the project. Consultants were used to complete the activities for this position.

4. Were changes in conducting the project made when evidence was shown to indicate a need for changes? As specified in answers to questions 1 and 3, changes were made promptly and effectively when evidence was shown changes were needed. The major change which was needed in the overall conduction of the project was for an additional period of time to

field test the developed materials. However, under the financial and time constraints of the project this was not possible.

PRODUCT EVALUATION RESULTS

The purpose of product evaluation is to measure and interpret achievements of the project. In obtaining product evaluation, answers to the following questions were sought.

1. What products were produced by the project? The following products were produced:

   a. Worker characteristic profile based on survey of handicapped scientists throughout the United States.
   b. Ten filmstrips with audio tapes and printed scripts.
   c. Microfiche version of career briefs for 228 science-related careers.
   d. Printed career briefs for 228 science-related careers (18 point type).
   e. Braille volumes of information on 228 science-related careers.
   f. Recorded audio tapes of the career briefs for 228 science-related careers.
   g. Self, career and decision making exercises.

   In summary, the products developed were more extensive than specified in the proposal.

2. How effective were the inservice training methods used?

   As products of the project were distributed to users at the field test sites, inservice training was provided to those who would assist disabled individuals in using the materials. Correspondence from field test sites revealed the inservice training was well received. The only problem encountered by users was effective use of the microfiche readers for the microfiche. Follow-up in-service training should have been used to alleviate this minor problem.

3. What objectives were actually accomplished by the project? All objectives dealing with the products to be developed were accomplished to a greater extent than was proposed. The only shortcoming was the field test of developed materials. Time contraints prevented the field test from being carried out effectively.

4. Were the materials developed acceptable to disabled scientists? Time did not allow for an indepth collection and examination of disabled scientists' reactions to the materials. However, informal feedback from selected scientists indicated they were well pleased with the materials. Since the format and presentation of the materials were based solely on the suggestions of disabled scientists, it is

believed the informal feedback was a valid measure.

IMPACT EVALUATION RESULTS

The purpose of the proposed impact evaluation was to assess the acceptance and adoption of the project products after they had been used for a period of time. Since time contraints did not allow for sufficient field test time, this phase of the evaluation could not be conducted. However, the following tentative information on impact evaluation was obtained in answering the following questions.

1. Are the developed materials transportable to other states? The favorable reactions of career information personnel counselors from other states indicated strongly that they believed the materials would be beneficial for use in their states. This information was obtained from individuals at national meetings where presentations on the project were made.

2. Did counselors, science teachers and administrators react favorably to the developed program? As evidenced by letters from various individuals, it was clear that others were impressed with the quantity and quality of the products developed.

3. Were products developed for specific target groups of handicapped individuals favorable accepted? A User Reaction Questionnaire (See Appendix I.) was completed by a sample of 15 users who had used the developed materials at the field test sites during the brief field test period. Results of this survey are provided in Table 1 on the following page. As can be seen by reviewing the responses for four of the statements, users agreed or strongly agreed with respect to the quality and benefit of the produced materials. With respect to the statement regarding how the materials compared with other materials on careers, only two users had no opinions, the others agreed the developed materials were better. With respect to whether the materials helped the users learn something about themselves in relation to the world of work all users but one agreed they had.

TABLE 1

ANALYSIS OF RESULTS OF HOW USERS REACTED TO

STATEMENTS ABOUT THE DEVELOPED MATERIALS

STATEMENTS	Reactions									
	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
	No.	%	No.	%	No.	%	No.	%	No.	%
1. The materials were easy to read and/or were easy to understand.	0	0	0	0	0	0	6	40	9	60
2. The information presented in the materials were of interest to me.	0	0	0	0	0	0	7	47	8	53
3. I would use these materials again if I had the opportunity.	0	0	0	0	0	0	6	40	9	60
4. These materials are the best materials on careers I have ever used.	0	0	0	0	2	13	8	53	5	33
5. I learned something about myself in relation to the world of work by studying the materials.	0	0	0	0	1	7	9	60	5	33
6. I would recommend these materials to a friend who wishes to explore careers.	0	0	0	0	0	0	5	33	10	67

When asked to respond to the question: "What did you like best about the materials you used?"---examples of responses given were as follows.

"Good organization of materials and good visual aids well presented."

"I did not know that handicapped people could do the same jobs as other people."

"Extremely informative."

"The clarity of the filmstrips and the conciseness of the tapes."

"There were so many points of interest and questions answered about each job."

"I was amazed at the amount of information contained in the program."

When asked to respond to the question: "What did you like least about the materials you used?" ---examples of responses given were as follows.

"Would like to see more science careers that do not require an extensive amount of educaiton."

"That I didn't get to use it longer each day."

"I wish there were more exercises."

"I liked the microfilm machine except for sliding the film under the slide. It was still confusing even after being explained."

SUMMARY

In summary, all developmental objectives of the project were met to a high degree. Overall project management was outstanding. Major problem encountered was lack of time for adequate field testing of developed materials.

It is recommended that the materials be field tested at selected sites for a period of at least 9 months. In addition, an indepth evaluation should be made of this field test to determine if any materials need to be modified, deleted or added to the total program.

SCI-PHI
USER REACTION QUESTIONNAIRE

A. PLEASE PLACE A CHECK MARK BY THE TYPE(S) OF MATERIAL USED.

___1. MICROFICHE
___2. PRINTED MATERIALS
___3. BRAILLE MATERIALS
___4. FILMSTRIP & AUDIO TAPES
___5. AUDIO TAPES
___6. OTHER_____

B. CIRCLE THE NUMBER WHICH INDICATES YOUR DEGREE OF AGREEMENT WITH EACH OF THE FOLLOWING STATEMENTS.

	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE
	1	2	3	4	5
1. THE MATERIALS WERE EASY TO READ AND/OR WERE EASY TO UNDERSTAND.	1	2	3	4	5
2. THE INFORMATION PRESENTED IN THE MATERIALS WERE OF INTEREST TO ME.	1	2	3	4	5
3. I WOULD USE THESE MATERIALS AGAIN IF I HAD THE OPPORTUNITY	1	2	3	4	5
4. THESE MATERIALS ARE THE BEST MATERIALS ON CAREERS I HAVE EVER USED.	1	2	3	4	5
5. I LEARNED SOMETHING ABOUT MYSELF IN RELATION TO THE WORLD OF WORK BY STUDYING THE MATERIALS	1	2	3	4	5
6. I WOULD RECOMMEND THESE MATERIALS TO A FRIEND WHO WISHES TO EXPLORE CAREERS.	1	2	3	4	5

C. PLEASE ANSWER THE FOLLOWING QUESTIONS:

1. WHAT DID YOU LIKE BEST ABOUT THE MATERIALS YOU USED?

_____

_____

2. WHAT DID YOU LIKE LEAST ABOUT THE MATERIALS YOU USED?

_____

_____